Whitebark Pine Cone Production

2014 PROJECT SUMMARY

Interagency Grizzly Bear Study Team

Whitebark pine (*Pinus albicaulis*) surveys on established transects indicated generally above average cone production during 2014 (Figure 1). IGBST partners conducted surveys on 21 transects. Overall, the mean number of cones/tree was 20.0 (Table 1). Cone production on most transects was above average but there were several exceptions; transects G, Q1, and CS-D, averaged ≤2 cones/tree (Table 2). Cone production among extant trees during 2014 was good compared to the 5.2 cones/tree average observed during 2013 (Figure 2).

Although we continue to observe tree mortality caused by mountain pine beetle (D*endroctonus ponderosae*) in stands that contain our cone production transects, we observed only 2 additional beetle-caused mortalities among individual trees surveyed since 2002. Total mortality on transect trees since 2002 is 75.3% (143/190) with 100% (19/19) of transects containing beetle-killed trees. Although tree mortality from mountain pine beetle is still occurring, it appears the rate of loss among our cone production transects has slowed (Figure 3). Consequently, at least in the vicinity of these transects, the current beetle outbreak may have run its course. Six (85.7%) of the 7 transects established during 2007 (Table 2; CSA–CSG) also exhibited beetle-caused mortality among transect trees.

Grizzly bears (*Ursus arctos*) typically search for this key fall food at elevations above 8,000 ft. However, extensive areas of beetle-killed whitebark pine may reduce cone abundance and availability locally. Historically, numbers of grizzly bear-human conflicts and management actions tend to decrease during years with good cone production, but the whitebark pine mortality evident in many areas may dampen or modify this trend. Increases in bear numbers and range expansion during the last 2 decades in the GYE likely also played a role in the numbers of fall conflicts observed during recent years: as bear numbers increase, numbers of conflicts increase. However, regardless of increases in occupied range,

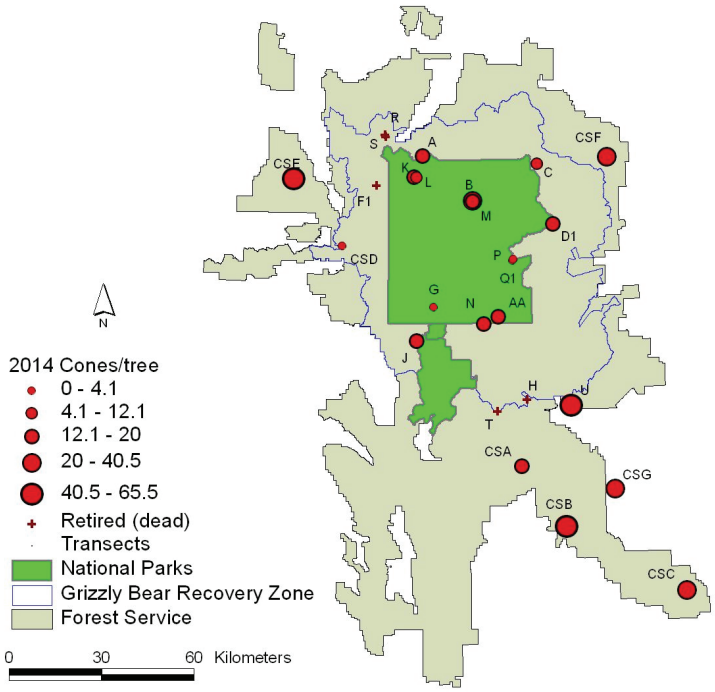

Figure 1. Locations and mean number of cones/tree for 21 whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 2014.

Table 1. Summary statistics for whitebark pine (*Pinus albicaulis*) cone production transects surveyed during 2014 in the Greater Yellowstone Ecosystem.

Total			Trees				Transect			
Cones	Trees	Transects	Mean cones	SD	Min	Max	Mean cones	SD	Min	Max
3508	175	21	20.05	28.08	0	151	167.05	151.00	5	655

Table 2. Whitebark pine (*Pinus albicaulis*) cone production transect results for 2014.

Transect	Cones	Trees	Mean	SD
A	83	5	16.6	32.2
B	294	10	29.4	15.0
C	107	10	10.7	8.8
D1	82	5	16.4	9.8
F1	Retired in 2008			
G	20	10	2.0	5.3
H	Retired in 2008			
J	200	10	20.0	21.0
K	134	9	14.9	11.3
L	121	10	12.1	8.3
M	175	10	17.5	12.2
N	146	10	14.6	19.0
P	41	10	4.1	4.7
Q1	5	10	0.5	1.0
R	Retired in 2009			
S	Retired in 2010			
T	Retired in 2008			
U	48	1	48.0	
AA	191	10	19.1	16.6
CSA	169	10	16.9	14.3
CSB	655	10	65.5	48.7
CSC	365	10	36.5	38.8
CSD	12	9	1.3	1.7
CSE	113	2	56.5	44.5
CSF	142	4	35.5	33.7
CSG	405	10	40.5	29.7

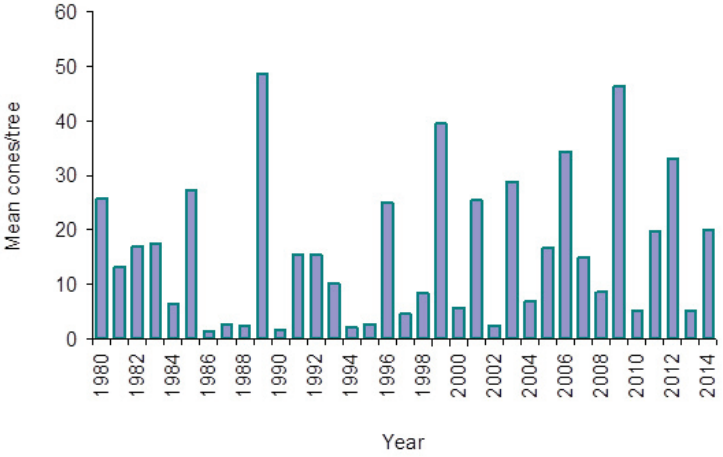

Figure 2. Annual mean cones/tree on whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 1980–2014.

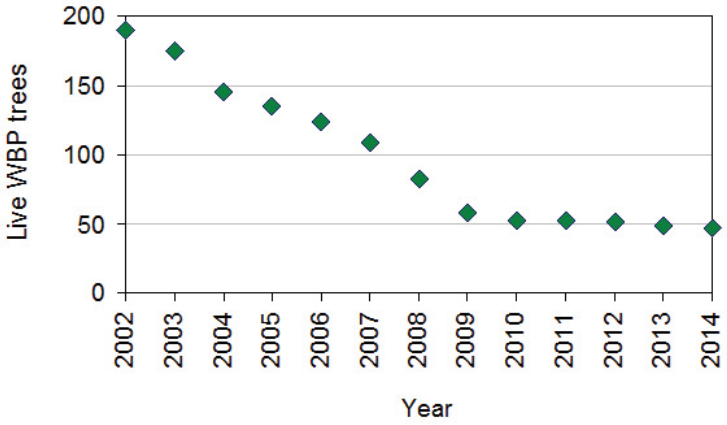

Figure 3. Number of live whitebark pine (WBP) trees on cone production transects among 190 individual trees monitored since 2002.

bear numbers, and the availability and abundance of fall foods, recreationists, hunters, and those who live in bear country are urged to use appropriate measures to avoid encounters with grizzly bears. These include food security in front country and backcountry settings, particularly during fall months. Backcountry users are strongly encouraged to carry bear spray and know how to use it. Studies have shown bear spray is effective in self-defense situations.

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